

DETAILED ACTION

This office action is responsive to amendment filed on 12/29/2009.

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Joan Obispo Arbolante on 3/26/2010.

The application has been amended as follows:

- Claims 4 and 5 are cancelled.

- Claims 1, 21, and 27 have been amended as follows:

1. A method for building a failover-enabled communications link, comprising:
 - receiving, by a first Fibre Channel (FC) storage device, input of a plurality of upper-level addresses, based on an upper-level protocol, assigned to a FC port of the first FC storage device, the first FC storage device supporting the FC protocol at a base layer, wherein the plurality of upper-level addresses includes a primary address and a backup address, wherein the backup address is associated with a second FC storage device;
 - registering, by the first FC storage device, a symbolic name for the FC port of the first FC storage device with a name server, wherein a symbolic name field is encoded with the plurality of upper-level addresses including the primary address, and the backup address associated with the second FC storage device, wherein the symbolic name is encoded with the primary address and the backup address based on a predefined encoding scheme that includes using selected bytes in the symbolic name field defined in the FC protocol to store the primary address and the backup address;

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detecting, by the first FC storage device, a link failure between the second FC storage device and a third FC storage device;

determining, by the first FC storage device, the backup address based on the position[[s]] of the backup address plurality of upper-level addresses within the symbolic name field; and

linking, by the first FC storage device, the FC port of the first FC storage device over a fabric network to the third FC storage device using the backup address determined from the symbolic name field.

21. A storage device, comprising:

a processor;

a memory coupled to the processor, the memory storing instructions which when executed by the processor cause the storage device to perform a method comprising:

receiving input of a plurality of IP addresses to be associated with a first Fibre Channel (FC) N_Port of the storage device, the storage device supporting the FC protocol at a base layer, wherein the plurality of IP addresses includes a primary IP address and a backup IP address, wherein the backup IP address is associated with a second FC N_Port on a second storage device;

registering, with a name server, the plurality of IP addresses as a symbolic name for the first FC N_Port of the storage device within a symbolic name field, wherein the symbolic name field is encoded with the plurality of IP addresses including the primary IP address, and the backup IP address associated with the second FC N_Port on the second storage device, wherein the symbolic name is encoded with the primary IP address and the backup IP address based on a predefined encoding scheme that includes using selected bytes in the symbolic name field defined in the FC protocol to store the primary IP address and the backup IP address;

detecting, by the storage device, a link failure between the second storage device and a third storage device;

determining the backup IP address based on the position[[s]] of the backup IP address plurality of IP addresses within the symbolic name field; and

linking the first FC N_Port of the storage device over a fabric network to the third storage device using the backup IP address determined from the symbolic name field.

27. A non-transitory computer readable storage medium, having stored thereon on a sequence of instructions which when executed by a processor for a storage device, causes the storage device to perform a method comprising:

receiving input of a plurality of IP addresses to be associated with a first Fibre Channel (FC) N_Port of the storage device, the storage device supporting the FC protocol at a base layer, wherein the plurality of IP addresses includes a primary IP address and a backup IP address, wherein the backup IP address is associated with a second FC N_Port on a second storage device;

registering, with a name server, the plurality of IP addresses as a symbolic name for the first FC N_Port of the storage device within a symbolic name field, wherein the symbolic name field is encoded with the plurality of IP addresses including the primary IP address, and the backup IP address associated with the second FC N_Port on the second storage device, wherein the symbolic name is encoded with the primary IP address and the backup IP address based on a predefined encoding scheme that includes using selected bytes in the symbolic name field defined in the FC protocol to store the primary IP address and the backup IP address; and

detecting, by the storage device, a link failure between the second storage device and a third storage device;

determining the backup IP address based on the position[[s]] of the backup IP address ~~plurality of IP addresses~~ within the symbolic name field; and

linking the first FC N_Port of the storage device over a fabric network to the third storage device using the backup IP address determined from the symbolic name field.

28. The non-transitory computer readable storage medium of claim 27, wherein the method further comprises registering communications protocols supported by the first FC N_Port with the name server for a FC fabric to which the first FC N_Port is connected.

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29. The non-transitory computer readable storage medium of claim 27, wherein registering with the name server the symbolic name encoded with a primary IP address, and a backup IP address associated with a second FC N_Port on a second storage device comprises a first registration operation to register the primary IP address and a second registration operation to register the backup IP address.

30. The non-transitory computer readable storage medium of claim 29, wherein the first registration operation and the second registration operation are the same operation.

31. The non-transitory computer readable storage medium of claim 29, wherein the method further comprises detecting a failure of a primary link between a pair of remote N_Ports, wherein one of the remote N_Ports has the backup IP address as a primary IP address.

32. The non-transitory computer readable storage medium of claim 31, wherein the second registration operation is performed after detecting the failure.

Allowable Subject Matter

Claims 1-3, 6, 7, and 21-32 are allowed based on applicant's Amendments/Remarks filed on 12/29/2009 and examiner's Amendment filed on 3/26/2010.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael C. Lai whose telephone number is (571) 270-3236. The examiner can normally be reached on M-F 8:30 - 5:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ario Etienne can be reached on (571) 272-4001. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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